

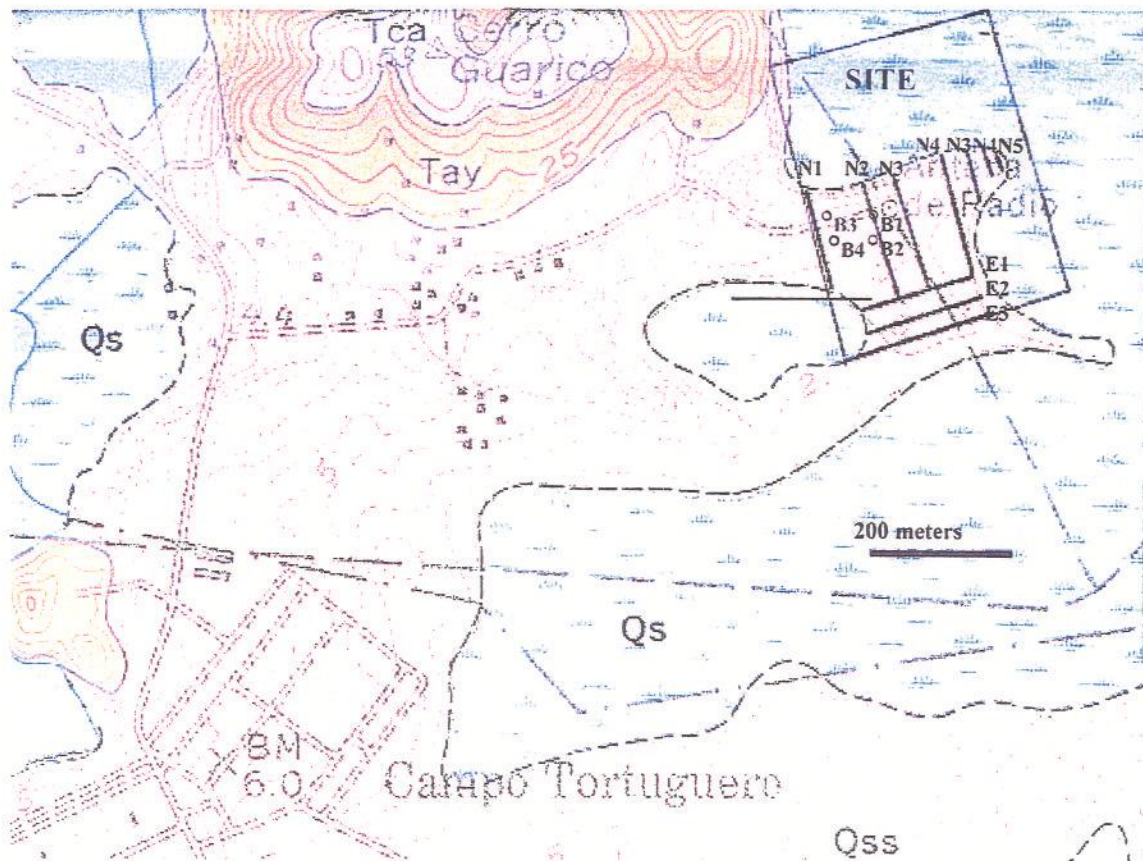
# **EXHIBIT F**

## **Joyce Report**

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**Revised Silica Sand Extraction Volume Estimates  
Juan Piza Blondet Property  
Barrio Guarico Viejo, Vega Baja  
Puerto Rico**

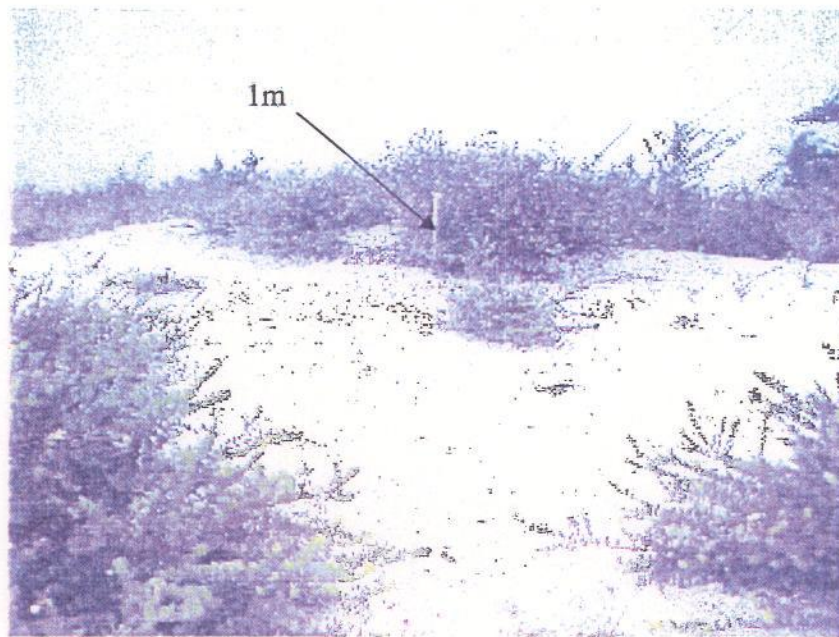
Submitted on behalf of  
Juan Piza Blondet  
To  
Carlos Gastambide, MAI, MIE  
Professional Real Estate Appraiser  
Suite 1515 Banco Popular Center  
Hato Rey, San Juan  
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**Figure 1 Geologic Map of the Manati Quadrangle**

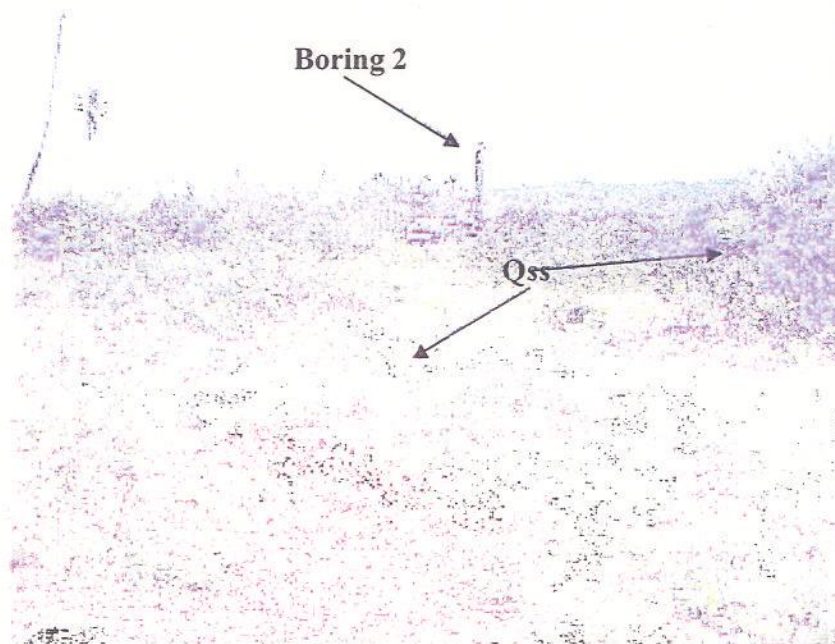
#### **Evaluation of Silica Sand Distribution**

The geologic map shows that the silica sand covers all of the site area above 1-meter elevation and states that the thickness of these deposits ranges from 1-4 meters. The exposure of the sand in mounds or dunes around the site indicates thickness of at least 2 meters. However as the topography only varies from 1-3 meters it is impossible to estimate the actual thickness from surface exposures. In order to better evaluate the thickness of the silica sand deposits



**Photo 1 Mounds or dunes of silica sand east of antenna**

below the site, 4 soil borings were drilled at the north side of the site near the access road. The borings were sampled continuously to



**Photo 2 Loose silica sand along the access road**

depths ranging from 15 to 24 feet. The thickness of silica sand in the soil borings varied greatly (Figure 2). B1 consisted of 12 feet of silty clayey sand overlying stiff sandy clay. B2 consisted of 23 feet of mainly silty sand overlying hard sandy clay. B3 consisted of 7-8 feet of silty and clayey sand overlying sandy clay. B4 only had 3-4 feet of silty clayey sand overlying sandy clay. Groundwater was only encountered in B2 at an elevation of



A Simple Permit (Sec. 2.47, "Permiso Simple") is defined as authorization emitted by the Secretary or authorized agent for small-scale excavation extraction or removal of earth materials, either for commercial or noncommercial purposes, up to a limit 1,000 cubic meters for sand and 5,000 cubic meters for other earth materials. Section 4.1 covers applicability and states that if the intended use of the excess material is commercial sales then the activity should be authorized under a formal permit. Section 4.2 covers required submittals; #9 states that if excess material is to be removed from the site and deposited elsewhere, a sworn statement is required from the recipient as well as any other applicable or corresponding authorizations. The present regulations leave open the possibility to sell silica sand as excess material when the extraction permit was granted for purposes other than commercial exploitation of the sand.

A Formal Permit (Sec. 2.45, Permiso Formal) is defined as authorization emitted by the Secretary or authorized agent for excavation extraction, removal and dredging of earth material components on a large scale or for commercial purposes, or when the magnitude or complexity of the operation merits a rigorous major technical and legal evaluation or study, whether or not it is for commercial purposes. The basic form of the permit for silica sand extraction requires an environmental evaluation, soil borings of 15 feet deep no more than 100 meters apart, and limits extraction to the depth of the phreatic or ground water level and to within 10 meters of the adjacent wetlands as delineated by the COE (U.S. Army Corps of Engineers).

Permission to extract silica sand below the ground water level requires a complete Environmental Impact Statement, analysis of groundwater flow pattern and potential impact on any water wells within 500 meters. Sand extraction pits are limited in size to less than 1200 square meters and in depth to 4 meters below the groundwater level and must be at least 10 meters away from adjacent wetlands as delineated by COE. The extraction pits must be filled with limestone or igneous-volcanic rock simultaneous with extraction and the location of the intended fill material must be documented in the permit application.

The site conditions are and were at the time of taking overall favorable to obtain silica sand extraction permits. The Laguna Tortuguero Reserve lies about 1 kilometer away from the site and is separated by a topographic high greater than 5 meters. Therefore any development or extraction at the site would have no impact on the nature preserve. The required 10 meter buffer zone would restrict any impact on the adjacent wetland areas. The boundary between the two is clearly defined by an abrupt change in vegetation and soil as seen in photo 3 below.

primary ingredient in its manufacturing process. In 1995 the company awarded the Dept. of Geology at UPR-Mayaguez a grant entitled "Quartz sands of Puerto Rico: A proposal to expand the existing reserve of raw material for the production of glass" to help them find more available silica sand resource. The necessity for silica sand in the Owens Illinois glass manufacturing process persists and they remain active in pursuing new resources of the material.

### **Conclusions**

1. About half of the expropriated Pizá property is covered and underlain by silica sands. These sands are a valuable and exploitable resource.
2. Expropriation of the property for the construction of the FAA facility precluded exploitation of the silica sand deposits.
3. The silica sand in the property is part of the extensive and thick Laguna Tortuguero silica sand deposits.
4. Soil borings and field observations at the property site indicate silica sand thickness ranging from 2 meters to 7 meters.
5. The permissible silica sand extraction volume estimates based on interpreted soil profiles ranged from a maximum of 235,957 cubic meters to a minimum of 92,125 cubic meters.
6. The most probable, best estimate of extractable silica sand volume that would be permissible is 162,759 cubic meters. This is a reasonable estimate to be used in determining the true value of the expropriated property for just compensation.
7. Owens Illinois was an active consumer of silica sand at the time of taking and remains so at present. They would have gladly purchased all of the extracted silica sand for glass manufacturing either before or after the time of taking.

Respectfully Submitted

James Joyce PhD, PG  
2/9/2005